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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/936,011	11/06/2001	Gerard Jonard	9997.34USWO	7797

23552 7590 03/24/2003

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EXAMINER
MEHTA, ASHWIN D

ART UNIT	PAPER NUMBER
1638	8

DATE MAILED: 03/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/936,011	JONARD ET AL.	
	Examiner	Art Unit	
	Ashwin Mehta	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 November 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1. The specification fails to comply with 37 CFR 1.74, which requires that there be a brief description of the drawings. New matter must be avoided.

Claim Objections

2. Claims 1-22 are objected to for the following minor informalities:

In claims 1 and 11: the claims should begin with the article --A--.

In claims 2-9 and 12-22: the claims should begin with the article --The--.

In claims 6 and 15: the recitation "(*Beta vulgaris*)" should not be in parentheses, but rather separated by commas.

Further in claims 6 and 15: the claims are objected to under 37 CFR 1.821 (d) for failing to identify the nucleotide sequence by its SEQ ID NO. Figure 1 of the specification presents the nucleotide sequence of bases 3287 to 3643 of RNA2 of a BNYVV isolate, and this sequence is also set forth in SEQ ID NO: 1. If this is the sequence that is being referred to, then the claims should identify this nucleotide sequence as SEQ ID NO: 1.

In claim 8: it appears that the term "foreigner" in line 3 should be --foreign--.

In claim 9: the recitation "the preceding" in line 1 should be removed.

In claims 15 and 19: *Beta vulgaris* and *Perosponia andersonii* should not be underlined.

In claim 22: the conjunction --and-- should be inserted in line 2 before "seed".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1: the recitation "and possibly" in line 10 renders the claim and those dependent thereon indefinite. The recitation does not make clear whether or not the method step the follows it is performed. The claim is also indefinite because the last step of the method is not consistent with the first line. The preamble indicates that the method is for inducing resistance to a group I virus comprising a TGB2 sequence. However, the last step of the method only indicates that a transformed plant cell or regenerated plant is formed. It should also indicate that expression of the nucleotide sequence in said transgenic plant cell or transgenic plant results in increased resistance against said virus compared to an untransformed plant cell or plant of the same species.

Further in claim 1: the recitation also "inducing resistance" renders the claims indefinite. The specification at pages 11-12 indicates that "induce a viral resistance into a plant" means inducing a possible reduction or a significant delay in the appearance of infection symptoms, viral multiplication, or diffusion mechanisms into the plant. However, it is not clear what is meant by "possible reduction" or "significant." It is also not clear what is meant by "inducing." This can imply that the method comprises the use of an inducible promoter to express the TGB2 sequence.

In claims 1, 3, 11, and 20: the recitation "group I viruses" renders the claims indefinite. It is not clear what defines a virus as belonging to "group I." The specification does not define all of the traits of group I viruses versus those of group II or any other groups. The specification on page 4, lines 26-32, indicates that the characteristics of a virus' TGB have allowed their classification into two groups. However, these distinguishing TGB characteristics are not defined. Further, lines 33 and 34 of page 4 indicates that the capsid protein of group II viruses are involved in cell-to-cell movement. However, this does not define the TGB characteristics that place a virus in group I. Further, while lines 29-32 lists some group I viruses, this list is not complete. It is not clear what other viruses belong to group I. The specification also refers to several prior art references, on page 4, line 32. However, these references do not even mention "group I" or "group II," or any other group.

In claims 1, 2, 11, and 12: the recitation "comprising a nucleotide sequence having at least 70% (or 80%) homology with the nucleotide sequence of TGB2 of said virus or its complementary cDNA" in claims 1, 2, 11, and 12 renders the claims indefinite. The recitation "said virus" is referring back to the recitation "group I virus." It is not clear what group I virus the "said virus" is referring to, and it is then not clear which nucleotide sequence of TGB2 is to be compared to define the nucleotide sequence that has 70% homology. Further, it is not clear if "complementary cDNA" is referring to the cDNA itself, or the complementary sequence of the cDNA.

In claims 2-10, 12, 13, 15-21: the recitation "characterized in that" renders the claims indefinite. It is not exactly clear what is meant by "characterized". It is suggested that the recitation be replaced with "wherein".

In claims 3, 6, 10, 13, 15, 19, and 21: a broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claims 3 and 13 recite the broad recitation "from the group consisting of hordeiviruses, benyviruses, pecluviruses and pomovirues", and the claim also recites that the virus is "preferably selected from" a group consisting of several specific viruses, which is the narrower statement of the range/limitation. Claims 6 and 15 recite "the plant is a beet", and then recites "preferably a sugar beet". Claims 10 and 19 recite "a promoter which is capable of being active mainly into the root tissues", and then recite "such as the par promoter of the haemoglobin gene from Perosponia andersonii". Claim 21 recites "further comprises a pesticide, herbicide or fungicide resistance" and then recites "preferably a resistance selected from the group consisting of nematode resistance, glyphosate resistance, glufosinate resistance and/or acetochloride resistance".

In claims 6 and 15: the recitation "5' strand" renders the claim indefinite. Genomic and subgenomic nucleic acids sequences have 5' and 3' ends, but genomic and subgenomic RNA strands are not referred to as "5'". It is not clear what is being referred to by "5' strand".

Further in claims 6 and 15: the recitation "the nucleotide sequence of TGB2 of said virus is comprised between the nucleotide 3287 and 3643 of the 5' strand of genomic or subgenomic RNA 2 of BNYVV" also renders the claim indefinite. There are many different isolates of BNYVV, and they do not share exactly the same nucleotide sequences. For example, Saito et al. (Arch. Virol., 1996, Vol. 141, pages 2163-2175) compare sequence differences in the triple gene blocks of different BNYVV isolates (pages 2172-2173). It is not clear which isolate, and therefore which nucleotide sequences between 3287 and 3643 of RNA 2, the claim is referring to. It is suggested that the claim refer to the sequence by its sequence identifier, as discussed above.

In claims 8 and 17: the recitation "constitutive or foreigner promoter sequence" in claim 8 and "constitutive or foreign promoter sequence" in claim 17 render the claims indefinite. Constitutive promoters are routinely used in plant molecular biology to express transgenic coding sequences in transgenic plants, wherein the promoter is not naturally found in the plant. One example is the CaMV 35S promoter. It is therefore not clear whether the cited recitation indicates that the foreign promoter sequence cannot be constitutive.

In claims 9 and 21: the claims are "Markush" type claims that employ incorrect Markush terminology. The recitation "and/or" is not correct.

In claims 10 and 19: the recitation "a promoter which is capable of being active mainly into the root tissues" renders the claims indefinite. It is not clear what is meant by "capable of". The metes and bounds of the claims are not clear.

In claim 12: the recitation "a nucleotide sequence corresponding to at least 80% homology" renders the claim indefinite. It is not clear what is meant by "corresponding to." The metes and bounds of the claims are not clear.

In claim 21: the claim indicates that the transgenic plant further comprises a pesticide, herbicide, or fungicide resistance. The term "or" indicates that the plant comprises only one of the stated resistances, not more than one. However, the claim goes on to indicate that the resistance is selected from a group that can consist of all three resistances. It is not clear if the claimed plant can have only one, or more than one, of pesticide, herbicide, and fungicide resistance.

4. Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are broadly drawn towards a method for inducing resistance to a group I virus comprising a triple gene block 2 (TGB2) sequence in a plant cell or plant, comprising preparing a nucleotide construct comprising a nucleotide sequence that is at least 70% or at least 80% homologous to the nucleotide sequence of TGB2 of said virus or its complementary cDNA, transforming a plant cell with said nucleotide construct; or said method wherein the virus is

BNYVV, the nucleotide sequence of said virus is comprised between nucleotides 3287 and 3643 of genomic or subgenomic RNA 2 of BNYVV and the plant is a beet; a transgenic plant resistant to a group I virus, said plant comprising said nucleotide construct; or wherein said plant carries natural tolerance to group I viruses; or wherein said transgenic plant further comprises pesticide, herbicide, or fungicide resistance; tissue selected from said transgenic plant.

The specification indicates that Figure 3 shows results of *Chenopodium quinoa* plants, coinoculated with a replicon construct comprising SEQ ID NO: 3 or some other mutants sequences of the nucleotide sequence of TGB2 of BNYVV, and wild type virus S12. The specification indicates that movement of BNYVV is inhibited. Local lesions were identified 8 days after inoculation. The specification indicates that the decreasing movement of BNYVV is mostly observed in the plant co-inoculated with the replicon comprising SEQ ID NO: 3, up to 100% inhibition. The specification states that this inhibition is not due to a blocking effect on RNA1 or RNA2 replication, but the replicons allow blocking of the biochemical mechanisms involved in cell-to-cell movements by infectious virus (page 12, lines 3-24).

However, the specification does not describe the nucleotide sequences encoding the TGB2 protein of all group I viruses, or sequences that have at least 70% or 80% homology to a TGB2 protein, and which confer resistance against any group I virus when expressed in a plant cell or plant. The specification provides references for TGB2 references for several viruses, in Table 1. However, the specification does not indicate that all TGB2 sequences of all group I viruses have been isolated. Further, as discussed above, it is not clear what defines a virus as a group I virus. The specification does not provide a sufficient description of "group I" which would allow one skilled in the art to identify a virus as belonging to this group.

The specification does not describe changes that may be made to any "group I" TGB2 sequence such that it confers virus resistance when expressed in the plant, other than the sequence set forth in SEQ ID NO: 3. The specification indicates that other sequences were tested (page 12). However, it is not clear where in the sequence of SEQ ID NO: 1 the other sequences, tested in the experiment presented in Figure 3, are found. A correlation of any such sequences with the ability to confer virus resistance cannot be made.

Furthermore, claims 1 and 11, as broadly interpreted, encompass expressing nucleotide sequences that express a non-mutated TGB2 protein or one whose functional activity has not been affected. The specification does not describe a method for inducing resistance to any virus by expressing any TGB2 protein whose functional activity has not been changed. Given the breadth of the claims encompassing nucleotide sequences of all group I viruses, and nucleotide sequences that have at least 70% or 80% homology to any TGB2-encoding nucleotide sequence of any group I virus, and the lack of written description as discussed above, the specification fails to provide an adequate written description of the multitude of nucleotide sequences encompassed by the claims.

5. Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claims are broadly drawn towards a method for inducing resistance to a group I virus comprising a triple gene block 2 (TGB2) sequence in a plant cell or plant, comprising preparing

a nucleotide construct comprising a nucleotide sequence that is at least 70% or at least 80% homologous to the nucleotide sequence of TGB2 of said virus or its complementary cDNA, transforming a plant cell with said nucleotide construct; or said method wherein the virus is BNYVV, the nucleotide sequence of said virus is comprised between nucleotides 3287 and 3643 of genomic or subgenomic RNA 2 of BNYVV and the plant is a beet; a transgenic plant resistant to a group I virus, said plant comprising said nucleotide construct; or wherein said plant carries natural tolerance to group I viruses; or wherein said transgenic plant further comprises pesticide, herbicide, or fungicide resistance; tissue selected from said transgenic plant.

The specification indicates that Figure 3 shows results of *Chenopodium quinoa* plants, coinoculated with a replicon construct comprising SEQ ID NO: 3 or some other mutated sequences of the nucleotide sequence of TGB2 of BNYVV, and wild type virus S12. The specification indicates that movement of BNYVV is inhibited in the inoculated plants. Local lesions were identified 8 days after inoculation. The specification indicates that the decreasing movement of BNYVV is mostly observed in the plant co-inoculated with the replicon comprising SEQ ID NO: 3, up to 100% inhibition. The specification states that this inhibition is not due to a blocking effect on RNA1 or RNA2 replication, but the replicons allow blocking of the biochemical mechanisms involved in cell-to-cell movements by infectious virus (page 12, lines 3-24).

However, the specification does not teach any nucleotide sequence that is at least 70% or 80% homologous to a TGB2 nucleotide sequence of so-called group I viruses and which inhibits movement of a group I virus when expressed in a transgenic plant. The specification indicates that C. quinoa plants were inoculated with replicons comprising different mutated TGB2

sequences of BNYVV, with the results shown in Figure 3 (page 12). However, the sequences of those mutant TGB2 sequences are not taught, except for SEQ ID NO: 3, and they are not evident from Figure 3. In the absence of guidance as to the nature of the mutations, undue experimentation would be required by one skilled in the art to determine what sequences can be mutated in any TGB2 nucleotide sequence of any group I virus, such that it retains at least 70% or at least 80% homology with the wild-type sequence. Further, the sequence of SEQ ID NO: 3 differs from SEQ ID NO: 1 in only 6 nucleotides. Furtherstill, the specification does not provide any guidance as to nucleotides of SEQ ID NO: 1 that can be changed, other than the changes that produced SEQ ID NO: 3.

Further, the specification does not enable inducing resistance against a group I virus in a plant cell. As discussed above, the specification teaches that SEQ ID NO: 3 decreased movement of BNYVV in the inoculated *C. quinoa* plants, and that this inhibition is not due to a blocking effect on RNA1 or RNA2 replication. This indicates that SEQ ID NO: 3 will not prevent the infection of plant cells by any group I virus, or replication of any group I virus in a plant cell, but rather blocks movement of BNYVV through the plant. In the absence of further guidance, undue experimentation would be required by one skilled in the art to use the claimed method to confer increased viral resistance in a plant cell.

Furtherstill, the specification does not teach how one would identify all group I viruses. As discussed above, the specification teaches that it is the characteristics or a virus' TGB sequence that places it in group I or II. However, the specification does not teach what these traits are. The specification only teaches that group II viruses require its coat protein for movement. This is not a distinguishing TGB2 sequence characteristic. The specification on

page 4, line 32 cites several references. However, these references do not teach what is different about TGB2 sequences between so-called group I and group II viruses. Examples in the prior art of "group I" and "group II" categories are lacking. In the absence of further guidance, it is not clear how one skilled in the art can identify a group I virus and practice the claimed method.

Furthermore, the specification does not provide any teaching at all that transgenic plants and plant cells expressing a wild-type TGB2 sequence, which is encompassed by "at least 70% homology," have increased resistance to group I viruses. Expression of a wild-type TGB2 viral sequence would not have an effect on that virus, as the virus itself produces the sequence. See also Genentech, Inc. V. Novo Nordisk, A/S, 42 USPQ2d 1001, 1005 (Fed. Cir. 1997), which teaches that "the specification, not the knowledge of one skilled in the art" must supply the enabling aspects of the invention. Even further, regarding claim 20: it is not clear how one skilled in the art would discern any effect on the plant due to expression of the transgenic TGB2 sequence, as the host plant apparently already has natural resistance against Group I viruses. It is not clear how one is to use such a plant, since the plant already is resistant to the viruses that the introduced TGB2 nucleotide sequence is intended to protect it from. See Genentech, Inc. V. Novo Nordisk, A/S, supra. Given the breadth of the claims, unpredictability of the art and lack of guidance of the specification, undue experimentation would be required by one skilled in the art to make and use the claimed invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-19, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beck et al. "'94" (Proc. Natl. Acad. Sci., 1994, Vol. 91, pages 10310-10314) in combination with Saito et al. (Arch. Virol., 1996, Vol. 141, pages 2163-2175), Bouzoubaa et al. (J. Gen. Virol., 1986, vol. 67, pages 1689-1700), Beck et al. "'91" (Virology, 1991, Vol. 183, pages 695-702), Hall et al. (WO 95/10178), Urwin et al. (Plant J., 1995, Vol. 8, pages 121-131), and Landsman et al. (Mol. Gen. Genet., 1988, Vol. 214, pages 68-73).

The claims are broadly drawn towards a method for inducing resistance of a group I virus comprising a triple gene block 2 (TGB2) sequence in a plant cell or plant, comprising preparing a nucleotide construct comprising a nucleotide sequence that is at least 70% or at least 80% homologous to the nucleotide sequence of TGB2 of said virus or its complementary cDNA, transforming a plant cell with said nucleotide construct; or said method wherein the virus is BNYVV, the nucleotide sequence of said virus is comprised between nucleotides 3287 and 3643 of genomic or subgenomic RNA 2 of BNYVV and the plant is a beet; a transgenic plant resistant to a group I virus, said plant comprising said nucleotide construct; or wherein said plant carries natural tolerance to group I viruses; or wherein said transgenic plant further comprises pesticide, herbicide, or fungicide resistance; tissue selected from said transgenic plant.

Beck et al. '94 teach the production of transgenic plants, expressing a mutant 13 kDa triple gene block protein (TGB2) from white clover mosaic virus (WClMV), that have broad-spectrum resistance to other viruses that express a TGB2 protein. Beck et al. also teach that the

proteins encoded by the central gene (TGB2) of the triple gene block of Potexvirus, Hordeivirus, and Furovirus groups have two hydrophobic domains suggestive of transmembrane proteins. Beck et al. '94 cite Beck et al. '91 as teaching the mutations of their mutant 13 kDa protein (pages 10310-10313).

Beck et al. '94 do not teach the transgenic sugar beet plants, the CaMV 35S promoter, nucleotide sequences having at least 70% homology with the nucleotide sequence of a TGB2 of a group I virus, and the par promoter from *Perosponia andersonii*.

Saito et al. teach comparisons of the nucleotide and amino acid sequences of the triple gene block, including P13 (TGB2), of different isolates of BNYVV. Saito et al. also assert that BNVYY causes rhizomania disease in sugar beets (pages 2163, 2172-2173).

Bouzoubaa et al. teach the nucleotide sequence of RNA-2 of BNYVV isolate F13, and its open reading frames, including that for the 13 kDa protein. The authors also assert that BNYVV causes rhizomania in sugar beet (pages 1693-1699).

Beck et al. '91 teach mutations that were introduced into the 13 kDa triple gene block protein that blocked the production of symptoms and spread of WClMV in plants. The authors also assert that the 13 kDa triple gene block protein of WClMV contains a conserved amino acid motif found in homologous proteins of other viruses, including barley stripe mosaic virus (BSMV) and beet necrotic yellow vein virus (BNYVV) (pages 695, 698-699, 701).

Hall et al. teach genetic transformation of sugar beet stomatal cells, and regeneration of the transgenic cells to transgenic plants. The introduced DNA also contains a herbicide resistance gene (pages 9-24; claims).

Urwin et al. teach the transgenic expression of a variant (Oc-IdeltaD86) of the cysteine proteinase inhibitor, oryzacystatin-1, in transgenic plants to confer resistance against nematodes. The use of the CaMV 35S promoter is also disclosed (pages 122-127). This reference is cited to address the limitations of claim 9, for disclosing the CaMV 35S promoter, and claim 22.

Landsman et al. teach the root-specific promoter from the haemoglobin gene of P. andersonii (pages 69-71). This reference is cited to address the limitation of claims 10 and 19.

It would have been obvious and within the scope of one of ordinary skill in the art at the time the invention was made to modify the method of conferring virus resistance to plants of Beck et al. '94 by mutating the TGB2 of other viruses that have one, including that of BNYVV taught by Saito et al. or Bouzoubaa et al., and expressing it in a transgenic plant. One would have known what mutations to make, as the mutated residues are taught by Beck et al. '91. One would have been motivated to make the corresponding mutation in other Hordeiviruses and Furovirses, including BNYVV, as Beck et al. '94 teach that the central gene of the triple gene block of Potexviruses, Hordeiviruses, and Furoviruses share hydrophobic domains, and as Beck et al. '91 teach that the 13 kDa triple gene block protein of WClMV and that of other viruses, including BSMV and BNYVV, share conserved motifs. It would also have been obvious to express the nucleotide sequence in other plants, including sugar beet plants, by following any appropriate transformation method, including the method taught by Hall et al. One would have been motivated to express the mutated TGB2 in sugar beet to confer resistance against BNYVV as Saito et al. and Bouzoubaa et al. assert that BNYVV causes rhizomania disease in sugar beet. It was obvious that any promoter of choice could have been used to express the nucleotide sequence, including the CaMV 35S promoter, which is commonly used in the art as

demonstrated by Urwin et al., or the P. andersonii par gene promoter taught by Landsman et al. The choice of promoter would have depended on one's desired end and is an optimization of process parameters. It would also have been obvious to express other transgenes in the transgenic plant, to achieve a desired end. For example, it would have been obvious to also express the Oc-IdeltaD86 coding sequence of Urwin et al. One would have been motivated to do so for the obvious reason of also conferring nematode resistance to the plant. It also would have been obvious to collect seed from the transgenic plant, for the purpose of propagation.

7. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baulcombe (Plant Cell, 1996, Vol. 8, pages 1833-1844), Saito et al. (Arch. Virol., 1996, Vol. 141, pages 2163-2175), Bouzoubaa et al. (J. Gen. Virol., 1986, vol. 67, pages 1689-1700), Hall et al. (WO 95/10178), Urwin et al. (Plant J., 1995, Vol. 8, pages 121-131), and Landsman et al. (Mol. Gen. Genet., 1988, Vol. 214, pages 68-73).

The claims are broadly drawn towards a method for inducing resistance of a group I virus comprising a triple gene block 2 (TGB2) sequence in a plant cell or plant, comprising preparing a nucleotide construct comprising a nucleotide sequence that is at least 70% or at least 80% homologous to the nucleotide sequence of TGB2 of said virus or its complementary cDNA, transforming a plant cell with said nucleotide construct; or said method wherein the virus is BNYVV, the nucleotide sequence of said virus is comprised between nucleotides 3287 and 3643 of genomic or subgenomic RNA 2 of BNYVV and the plant is a beet; a transgenic plant resistant to a group I virus, said plant comprising said nucleotide construct; or wherein said plant carries

natural tolerance to group I viruses; or wherein said transgenic plant further comprises pesticide, herbicide, or fungicide resistance; tissue selected from said transgenic plant.

Baulcombe discusses gene silencing and pathogen-derived resistance. Baulcombe reviews examples of plants expressing viral genes that become resistance to infection from that virus and viruses with genomes that have homologous nucleotide sequences (pages 1834-1838).

Baulcombe does not teach transgenic sugar beet plants, the CaMV 35S promoter, nucleotide sequences having at least 70% homology with the nucleotide sequence of a TGB2 of a group I virus, and the par promoter from *Perosponia andersonii*.

Saito et al. is discussed above.

Bouzoubaa et al. is discussed above.

Hall et al. is discussed above.

Urwin et al. is discussed above.

Landsman et al. is discussed above.

As broadly interpreted, the claims encompass expressing nucleotide sequence encoding a non-mutated or active TGB2 protein from a group I virus. It would have been obvious and within the scope of one of ordinary skill in the art at the time the invention was made to modify the methods of plant viral resistance, by expressing a viral nucleotide sequence in a plant, discussed by Baulcombe, and express sequences of a plant virus, including the nucleotide sequences encoding the TGB2 protein of the BNYVV isolates taught by Saito et al and Bouzoubaa et al., in transgenic plants. One would have been motivated to do so, to confer a gene silencing-mediated resistance to the plant against BNYVV and other viruses that share homology with its genome. It would also have been obvious to express the nucleotide sequence in other

plants, including sugar beet plants, by following any appropriate transformation method, including the method taught by Hall et al. One would have been motivated to express the nucleotide sequence in sugar beet, to confer resistance against BNYVV, as Saito et al. and Bouzoubaa et al. assert that BNYVV causes rhizomania disease in sugar beet. It was obvious that any promoter of choice could have been used to express the nucleotide sequence, including the CaMV 35S promoter, which is commonly used in the art as demonstrated by Urwin et al., or the P. andersonii par gene promoter taught by Landsman et al. The choice of promoter would have depended on one's desired end and is an optimization of process parameters. It would also have been obvious to express other transgenes in the transgenic plant, to achieve a desired end. For example, it would have been obvious to also express the Oc-IdeltaD86 coding sequence of Urwin et al. One would have been motivated to do so for the obvious reason of also conferring nematode resistance to the plant. It also would have been obvious to collect seed from the transgenic plant, for the purpose of propagation.

8. Claims 1-22 are rejected.

Contact Information

Any inquiry concerning this or earlier communications from the examiner should be directed to Ashwin Mehta, whose telephone number is 703-306-4540. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays from 8:00 A.M to 5:30 P.M. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson, can be reached at 703-306-3218. The fax phone numbers for the organization where this

application or proceeding is assigned are 703-305-3014 and 703-872-9306 for regular communications and 703-872-9307 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

March 21, 2003

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PATENT EXAMINER